

**WHAT IS CLAIMED IS:**

- 1           1. A method of fabricating a catadioptric lens system, said method comprising:  
2           fabricating a single catadioptric lens element having a bottom surface and an  
3           upper surface, the upper surface having a convex portion and a concave portion, both the  
4           convex and concave portions sharing a common axis of symmetry;  
5           cutting apart the catadioptric lens element to form  $2n$  pie-shaped segments,  
6           wherein  $n$  is an integer; and  
7           reassembling the  $2n$  pie-shaped segments to form the catadioptric lens system  
8           with  $n$  of the  $2n$  pie-shaped segments being located above a common plane and the rest of  
9           the  $2n$  pie-shaped elements being below the common plane.
- 1           2. The method of claim 1 wherein cutting the catadioptric lens element to form  
2           the  $2n$  pie-shaped segments is accomplished by cutting along a set of planes each of  
3           which contains the common axis.
- 1           3. The method of claim 1 wherein the  $2n$  pie-shaped segments are identically  
2           shaped.
- 1           4. The method of claim 1 wherein  $n = 1$ .
- 1           5. The method of claim 1 wherein  $n = 2$ .
- 1           6. The method of claim 5 wherein each of the four pie-shaped segments is a  $90^\circ$   
2           segment of the single catadioptric lens element.
- 1           7. The method of claim 1 wherein reassembling involves arranging each of the  $n$   
2           pie-shaped segments that are above the common plane to be opposite to and aligned with  
3           a corresponding different one of the  $n$  pie-shaped segments that are below the common  
4           plane.

1           8. The method of claim 1 wherein the convex portion is a reflective portion of the  
2 catadioptric lens element and the concave portion is a refractive portion of the  
3 catadioptric lens element.

1           9. The method of claim 1 wherein reassembling the four pie shaped segments  
2 relative to a common plane involves placing two of the four segments are above the plane  
3 with their bottom surfaces being substantially parallel to and facing the common plane  
4 and placing the other two of the four segments are below the common plane with their  
5 bottom surfaces substantially parallel to and facing the common plane.

1           10. The method of claim 9 wherein reassembling also involves orienting the four  
2 segments so that each one of the two segments above the common plane are aligned with  
3 and adjacent to a corresponding one of the two segments that are below the common  
4 plane.

1           11. The method of claim 10 wherein reassembling further involves orienting the  
2 two segments that are above the common plane so that they share an axis of symmetry  
3 and are radially opposite each other relative to that shared axis of symmetry.

1           12. A method of fabricating a catadioptric lens system, said method comprising:  
2 fabricating a single catadioptric lens element having a bottom surface and an  
3 upper surface, the upper surface having a convex portion and a concave portion, both the  
4 convex and concave portions sharing a common axis of symmetry;  
5 cutting apart the catadioptric lens element to form two identically pie-shaped  
6 segments; and  
7 reassembling the two pie-shaped segments to form at least part of the catadioptric  
8 lens system with one of the two pie-shaped segments being located above a common  
9 plane and the other of the two pie-shaped elements being below the common plane,  
10 wherein the bottom surfaces of the two pie-shaped elements are facing each other and  
11 substantially parallel to the common plane, and wherein the two pie-shaped segments are  
12 aligned with each other.

1           13. The method of claim 1 wherein cutting the catadioptric lens element to form  
2 the two pie-shaped segments is accomplished by cutting along a plane that contains the  
3 common axis.

1           14. A method of fabricating a catadioptric lens system, said method comprising:  
2 fabricating a single catadioptric lens element having a bottom surface and an  
3 upper surface, the upper surface having a convex portion and a concave portion, both the  
4 convex and concave portions sharing a common axis of rotational symmetry;

5 cutting apart the catadioptric lens element to form four substantially identical  
6 segments, wherein cutting involves cutting the catadioptric element along at least one  
7 plane that contains the common axis; and

8 reassembling the four segments to form the catadioptric lens system with two  
9 of the four segments being located above a common plane and the other two of the  
10 four elements being below the common plane, wherein the reassembled four  
11 segments have their bottom surfaces substantially parallel to the common plane, and  
12 wherein each of the two segments that is above the plane is aligned with and  
13 adjacent to a corresponding different one of the two segments that are below the  
14 common plane.

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